SUBSECTION 8.6

Public Health

8.6 Public Health

8.6.1 Introduction

The City of San Francisco intends the San Francisco Electric Reliability Project (SFERP) to improve public health in the Southeast San Francisco community. The SFPUC is pursuing the SFERP to support closure of old dirtier existing generation in the City both immediately and over the longer term and hence improve air quality. Nonetheless, the SFPUC recognizes that the SFERP will have impacts on the Southeast San Francisco community and is committed to developing a PM_{10} mitigation/community benefits package to ensure that the SFERP results in net public health benefits to the community. Section 4, Environmental Justice, describes these efforts in greater detail.

This subsection presents an assessment of risks to human health potentially associated with operation of the proposed SFERP in accordance with the requirements of the CEC. The conclusions from this analysis do not detract from the City's commitment to implement an acceptable PM_{10} mitigation/community benefits package. The subsection focuses on chemical pollutants that could be emitted or released. Air pollutants for which California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS) have been established are also addressed in Subsection 8.1.

The principal concerns for public health are associated with emissions of chemical substances to the air during routine operation of the proposed facility. Chemical substances in air that potentially pose risks to human health include byproducts from the combustion of natural gas.

Combustion byproducts with established CAAQS or NAAQS, including oxides of nitrogen (NO_x), carbon monoxide, sulfur dioxide, and fine particulate matter are addressed in the Ambient Air Quality subsection (see Subsection 8.1.3). However, some discussion of the potential health risks associated with these substances is presented in this subsection. Human health risks potentially associated with accidental releases of stored acutely hazardous materials at the proposed facility (aqueous ammonia) are also discussed in this subsection.

8.6.2 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this subsection. The relevant laws, ordinances, regulations, and standards (LORS) that affect public health and are applicable to this project are identified in Table 8.6-1. Table 8.6-1 also summarizes the primary agencies responsible for public health, as well as the general category of public health concerns regulated by each of these agencies. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the locations where each of these issues is addressed. Points of contact with the primary agencies responsible for public health are identified in Table 8.6-2.

8.6.3 Affected Environment

The SFERP will be a nominal 145-megawatt (MW) simple-cycle generating facility configured using three natural-gas-fired LM 6000 gas turbines and associated infrastructure. The project will include the construction of a new air-insulated 115-kV switchyard on the

west side of the site. Natural gas for the project will be delivered to the site via a pipeline tie-in made to an existing PG&E natural gas load center located adjacent to the site. Water for the project would be delivered via a City process water pump station located on Marin Street near Cesar Chavez to a new water treatment plant located on the southern portion of the project site, adjacent to 23rd Street.

TABLE 8.6-1
Summary of Primary Regulatory Jurisdiction for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Clean Air Act	Public exposure to air pollutants	U.S. Environmental Protection Agency (USEPA) Region IX California Air Resources Board (CARB) Bay Area Air Quality Management District (BAAQMD)	Based on results of risk assessment as per California Air Pollution Control Officers Association (CAPCOA) guidelines, toxic contaminants do not exceed typically used thresholds (see Subsection 8.6.3.2). Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. The impact from increases in emissions of criteria pollutants will be offset (see Subsection 8.6.5.1).
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Based on results of a risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings (see Subsection 8.6.4.2).
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region IX San Francisco Department of Public Health	An offsite consequent analysis was performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank (see Subsection 8.6.4.3 and Appendix 8.12A). A risk management plan (RMP) will be prepared prior to commencement of facility operations (see Subsection 8.6.5.3).
Health and Safety Code Sections 25531 to 25541	Public exposure to Regulated Substances	San Francisco Department of Public Health CARB BAAQMD	An offsite consequent analysis was performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank (see Subsection 8.6.4.3 and Appendix 8.12A).
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB BAAQMD	Based on results of a risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed typically-used thresholds (see Subsection 8.6.4.2).
Environmental Code Chapter 10, Department of Public Works, Order No. 171,378	Particulate matter and other air borne materials have been shown to have an adverse impact on public health	City Agencies awarding contracts and the San Francisco Department of Public Works	The SFPUC will implement dust reduction measures set forth in the Environmental Code and Order 171,378 during construction of the project.

TABLE 8.6-2
Summary of Agency Contacts for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Clean Air Act	Public exposure to air pollutants	USEPA Region IX	Gerardo Rios, 916-744-1259
		CARB	Mike Tollstrup, 916-322-6026
		BAAQMD	Brian Bateman, 415-749-4653
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Cynthia Oshita or Susan Long 916-445-6900
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region IX	Gerardo Rios, 916-744-1259
		San Francisco Department of Public Health	Sue Cone, 415-252-3991
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	San Francisco Department of Public Health	Sue Cone, 415-252-3991
		BAAQMD	Brian Bateman, 415-749-4653
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB	Mike Tollstrup, 916-322-6026
		BAAQMD	Brian Bateman, 415-749-4653
Department of Public Works, Order No. 171,378	Exposure by the public in general and school children in particular to dust from excavations	San Francisco Department of Public Works	Stanley DeSouza, 415-554-8369

The site (see Figure 2-1) is located on a 4.5-acre parcel located on a portion of the previously proposed Potrero Power Plant (Potrero PP) Unit 7 site. There are several sensitive receptor facilities (such as schools, day care facilities, convalescent centers, or hospitals) in the vicinity of the project site. The closest of these receptors is the Warm Water Cove Public Access area, a park located approximately 300 feet south of the project site. Sensitive receptors within a 3-mile radius of the project site are shown on Figure 8.6-1 and descriptions of the receptors are presented in Table 8.12-2. Further description of sensitive receptors within a 3-mile radius of the project site is presented in Subsection 8.12, Hazardous Materials.

The terrain within a 10-mile radius of the project is provided under separate cover on 7.5-minute U.S. Geological Survey (USGS) Quad maps, five sets of which have been

submitted to the California Energy Commission (CEC). Figure 8.6-2 provides an index of the 7.5-minute Quad maps within the project vicinity.

8.6.4 Environmental Consequences

Environmental consequences potentially associated with the project are human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed facility include ammonia, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion turbines, and ammonia and trace metals from the cooling tower. These chemical substances are listed in Table 8.6-3.

TABLE 8.6-3
Chemical Substances Potentially Emitted to the Air

Criteria Pollutants	Noncriteria Pollutants (Toxic Pollutants)	
Carbon monoxide	Ammonia	Xylene
Ozone	Acetaldehyde	Chromium
Sulfur dioxide	Acrolein	Polycyclic aromatic hydrocarbons (PAHs)
Oxides of nitrogen	1,3-Butadiene	Benzo(a)anthracene
Particulate matter	Benzene	Benzo(a)pyrene
	Ethylbenzene	Benzo(b)fluoranthene
	Formaldehyde	Benzo(k)fluoranthene
	Hexane	Chrysene
	Propylene	Dibenz(a,h)anthracene
	Propylene oxide	Indeno(1,2,3-cd)pyrene
	Toluene	Naphthalene
		Arsenic

8.6.4.1 Criteria Pollutants

Emissions of criteria pollutants will adhere to NAAQS or CAAQS as discussed in the Ambient Air Quality subsection (see Subsection 8.1.4). The proposed facility will also include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under Bay Area Air Quality Management District (BAAQMD) rules. Offsets will be provided for emissions of criteria pollutants that exceed specified thresholds to assure that the project will not result in an increase in total emissions in the vicinity. Finally, air dispersion modeling results (presented in the Ambient Air Quality, Subsection 8.1.5.1.2) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS), with the exception of the state PM_{10} and the state and federal $PM_{2.5}$ standards. The City intends to develop a PM_{10} mitigation package.

Potentially-sensitive individuals may become exposed to emissions of criteria pollutants from the project. Most of the criteria pollutants are associated with adverse effects to the respiratory system. Therefore, sensitive individuals would consist of individuals with pre-existing respiratory diseases such as asthma, bronchitis or chronic obstructive pulmonary disease.

Epidemiological studies have indicated that exposures to elevated levels of criteria pollutants, especially particulate matter and ozone, are associated with a variety of respiratory and cardiovascular effects. These effects may include aggravation of existing respiratory conditions, such as asthma. Because of concerns for potentially sensitive individuals, the SFPUC will make best efforts to obtain offsets locally to ensure that impacts on the local community from the SFERP are not offset against benefits to remote communities.

8.6.4.2 Toxic Pollutants

Potential impacts associated with emissions of toxic pollutants to the air from the proposed facility were addressed in a health risk assessment, presented in Appendix 8.1D. The risk assessment was prepared using guidelines developed under the AB 2588 Air Toxics "Hot Spots" Information and Assessment Act (California Air Pollution Control Officers Association [CAPCOA] 1993).

Emissions of toxic pollutants potentially associated with the facility were estimated using emission factors approved by the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (USEPA). The impact of the SFERP emissions on the concentrations of these pollutants in the air were estimated using dispersion modeling. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a risk assessment, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for noncancer health effects (for noncarcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI). The hypothetical MEI is an individual assumed to be located at the point where the highest concentrations of air pollutants associated with facility emissions are predicted to occur, based on air dispersion modeling. Human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MEI. If there is no significant impact associated with concentrations in air at the MEI location, it is unlikely that there would be significant impacts in any location in the vicinity of the facility.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ (microgram per cubic meter) over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in air over a 70-year lifetime. Evaluation of potential noncancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with reference exposure levels (RELs). A REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential noncancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is the hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in air were obtained from the *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines* (CAPCOA, 1993), and are presented in Table 8.6-4.

TABLE 8.6-4
Toxicity Values Used to Characterize Health Risks

Compound	Unit Risk Factor ($\mu g/m^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	2.7E-06	9.00E+00	—
Acrolein	—	0.06	1.9E-01
Ammonia	—	200	3.2E+03
Arsenic	3.3E-03	5.10E-01	—
Benzene	2.9E-05	60	1.3E+03
1,3-Butadiene	1.7E-04	20	—
Cadmium	4.2E-03	0.02	—
Chromium VI	1.4E-01	2.00E-03	—
Copper	—		1.00E+02
Ethylbenzene	—	2000	—
Formaldehyde	6.0E-06	3.0E+00	9.4E+01
Hexane	—	7000	—
Lead	1.20E-05		—
Mercury	—	0.09	1.80E+00
Naphthalene	—	9	—
Nickel	2.60E-04	0.05	6.00E+00
Polycyclic aromatic hydrocarbons	1.1E-03 to 1.1E-05*	—	—
Propylene	—	3000	—
Propylene oxide	3.7E-06	3.00E+01	3.10E+03
Silver	—	—	—
Toluene	—	3.00E+02	3.7E+04
Xylene	—	7.00E+02	2.20E+03
Zinc	—	3.50E+01	—

Source: CAPCOA, 1993
* URF varies by compound. Individual compounds and URFs are listed in Appendix 8.1C, Table 8.1C-1.

8.6.4.2.1 Toxic Air Pollutant Risks. A risk of 10 in one million is used by the Commission as a threshold for evaluating cancer risks associated with facility emissions. Excess lifetime cancer risks less than 1 in one million (1×10^{-6}) are not typically considered to represent significant public health impacts that require additional controls of facility emissions. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 8.1D.

The excess lifetime cancer risk associated with concentrations in air for the MEI location is estimated to be 0.02×10^{-6}, based on emissions from operation of the SFERP facility. The excess lifetime cancer risk is also presented graphically in Figure 8.6-3a. Note that there is no human habitation at the MEI location. As shown in Figure 8.1C-1, the MEI from SFERP is located in San Francisco Bay. The closest sensitive receptor is 0.5 mile from the facility site. The excess lifetime cancer risk at the closest inhabited location (a workplace) is 0.003 in one million.

The excess lifetime cancer risk at the closest residence is 0.01 in one million. The excess lifetime cancer risk associated with concentrations in air estimated for the MEI location based on diesel emissions during construction is 1.1 in one million. The MEI location for construction emissions is located very close to the project site, approximately 100 meters from the fenceline. The excess lifetime cancer risk from diesel emissions during construction at the nearest residence is 0.06 per million.

A hazard quotient of one as a threshold for noncancer effects is consistent with the guidelines presented in the *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines* (CAPCOA, 1993). The chronic noncancer hazard indices associated with concentrations in air estimated for the MEI location are 0.002, combined across all target organs. The chronic noncancer risk associated with the project is presented in Figure 8.6-3b. The acute noncancer hazard indices summed across all target organs was 0.03, and also fell below one for all target organs. The acute noncancer risk associated with the project is presented in Figure 8.6-3c.

The detailed methodology for the risk assessment is presented in CAPCOA, 1993, and the calculations used to estimate health risks associated with emissions to the air is presented in Appendix 8.1C.

8.6.4.2.2 Characterization of Risks from Toxic Air Pollutants. The estimates of excess lifetime cancer and noncancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have been used to extrapolate from high to low doses. This modeling procedure is designed to provide a conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that man is as sensitive as the most sensitive animal species). (USEPA, 1986; USEPA, 1996).

An excess lifetime cancer risk of 1×10^{-6} is typically used as a threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, originates from efforts by the Food and Drug Administration (FDA) to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose" (VSD), has become a standard used by many policy makers and the lay public for evaluating cancer risks.

Health risk assessments for toxic air pollutants are prepared conservatively, to assure protection of public health. Some of the key assumptions used to assure that risks are estimated in a protective manner include:

- Estimating maximum "worst-case" emissions from the facility. The maximum "worst-case" emission scenario does not have to be feasible from an operational or economic perspective.
- Estimating the levels (or concentrations) of chemicals in air based on worst-case meteorological conditions, including the wind speeds and direction that would result in the highest concentrations in air from facility emissions.

- Estimating potential human exposure to a hypothetical maximum exposed individual who is assumed to be located at the point where the highest pollutant concentrations will be found. The maximum exposed individual is assumed to be located at that point continuously (24 hours/day, 365 days/year) for a 70-year lifetime.
- The maximum exposed individual is assumed to be exposed through multiple exposure pathways: inhalation, soil ingestion, ingestion of breast milk as an infant and skin contact with soil.

The estimated lifetime cancer risks to the maximally exposed individual are less than 1×10^{-6} for air emissions from the SFERP facility, and the aggregated cancer burden associated with this risk level is less than one excess cancer case. The estimated lifetime cancer risks to the maximally exposed individual from diesel emissions during construction is slightly higher than 1×10^{-6} at the MEI location; however, the risks at locations with human habitations fall below 1×10^{-6}.

8.6.4.3 Hazardous Materials

There is the potential for disturbance of hazardous materials during the construction of the SFERP. Also, hazardous materials will be used and stored at the facility. The hazardous materials stored in significant quantities onsite and descriptions of their uses are presented in Subsection 8.12. As described in Subsection 8.13 on Waste Management, construction will be required to comply with the requirements of Article 22A of the San Francisco Health Code. In addition, the City will comply with the requirements of the City Environmental Code, Chapter 10 and Order No. 171,378 of the Department of Public Works.

Use of chemicals at the proposed facility will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate offsite could result in potential impacts to the public.

The California Health and Safety Code Sections 25531 to 25541 and Title 40 Code of Federal Regulations (CFR) Part 68 under the Clean Air Act establish emergency response planning requirements for Regulated Substances. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a Regulated Substance. The only regulated substance to be used at the facility is aqueous ammonia as discussed in Subsection 8.12. Aqueous ammonia may generate hazardous gases that could migrate offsite when released.

An offsite consequence analysis (OCA) was performed and is included in Appendix 8.12A. The OCA assesses the potential risks to humans at various distances from the site if a spill or rupture of the aqueous ammonia storage tank were to occur. Based on the results of this analysis, a catastrophic release of ammonia from the complete failure of the storage tank would result in ammonia concentrations 75 parts per million (ppm) extending offsite approximately 7 feet and 25 part per million ammonia concentrations extending 17 feet off the project site. In fact, releases to the north, south, and western boundaries of the SFERP, the boundaries accessible to the public, will not exceed a concentration of 5 ppm. At these concentrations, no public health impacts would be expected.

8.6.4.4 Operation Odors

Small amounts of ammonia used to control oxides of nitrogen (NO_x) emissions may escape up the exhaust stack but would not produce operational odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be 10 ppm or lower. After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable. Therefore, potential ammonia emissions are not expected to create objectionable odors. Other combustion contaminants are not present at concentrations that could produce objectionable odors. Operation odor from the water treatment facility will be controlled by enclosing the entire facility in a building and treating all exhaust air with an activated charcoal air filtration system.

8.6.5 Mitigation Measures

As stated earlier, in addition to purchasing offsets for criteria pollutants, the City will develop a PM_{10} mitigation/community benefits package to ensure that the SFERP results in net benefits to public health in Southeast San Francisco. Additional features of the SFERP design that are intended to reduce impacts on public health are described below.

8.6.5.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. BACT for the combustion turbine includes the combustion of natural gas.

The project will be required to offset NO_x emissions, and the City intends to offset both NO_x and POC emissions using local offsets to the greatest extent possible. In addition, the City will develop a PM_{10} mitigation/community benefits package.

8.6.5.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of natural gas as the only fuel at the proposed facility.

8.6.5.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in Subsection 8.12. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. Construction risks will be minimized through compliance with Article 22A of the San Francisco Health Code (as described in subsection 8.13), Chapter 10 of the Environment Code and order 171,378 of the San Francisco Department of Public Works. As to operations, the plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The SFERP will include the following design features:

- Curbs, berms, and/or concrete pits will be provided where accidental release of chemicals may occur.
- A fire protection system will be included to detect, alarm, and suppress a fire, in accordance with the applicable LORS.
- Construction of the aqueous ammonia storage system will be in accordance with applicable LORS.

An RMP for the facility will be prepared prior to commencement of facility operations. The RMP will estimate the risk presented by handling ammonia at the facility. The RMP will include a hazard analysis, offsite consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment, (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for SFERP personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either an oily waste collection sump or wastewater collection sumps. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

8.6.6 References

California Air Pollution Control Officers Association (CAPCOA). 1993. *Air Toxics "Hot Spots" Program, Revised 1992 Risk Assessment Guidelines.* California Air Pollution Control Officers Association. October.

Hutt, P.B. 1985. "Use of Quantitative Risk Assessment in Regulatory Decision-Making under Federal Health and Safety Statutes," in *Risk Quantitation and Regulatory Policy*. Eds. D.G. Hoel, R.A. Merrill, and F.P. Perera. Banbury Report 19, Cold Springs Harbor Laboratory.

San Francisco Department of Public Health. 1998. Order No. 171,378.

U.S. Environmental Protection Agency (USEPA). 1986. "Guidelines for Carcinogen Risk Assessment." *Federal Register*. 51:33992. September 24.

U.S. Environmental Protection Agency (USEPA). 1996. *Proposed Guidelines for Carcinogen Risk Assessment*. U.S. Environmental Protection Agency, National Center for Environmental Assessment. EPA/600/P-92/003C. April.

FIGURE 8.6-1a
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_20

CH2MHILL

SITE LOCATION

LEGEND

- 70 — SCHOOLS
- 49 — PARKS AND RECREATION FACILITES
- 48 — DAY CARE FACILITIES
- 22 — HOSPITALS AND LONG-TERM HEALTH CARE FACILITIES
- 3-MILE LIMIT

1:24000 SCALE APPROX

D012004005RDD_19

FIGURE 8.6-1b
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

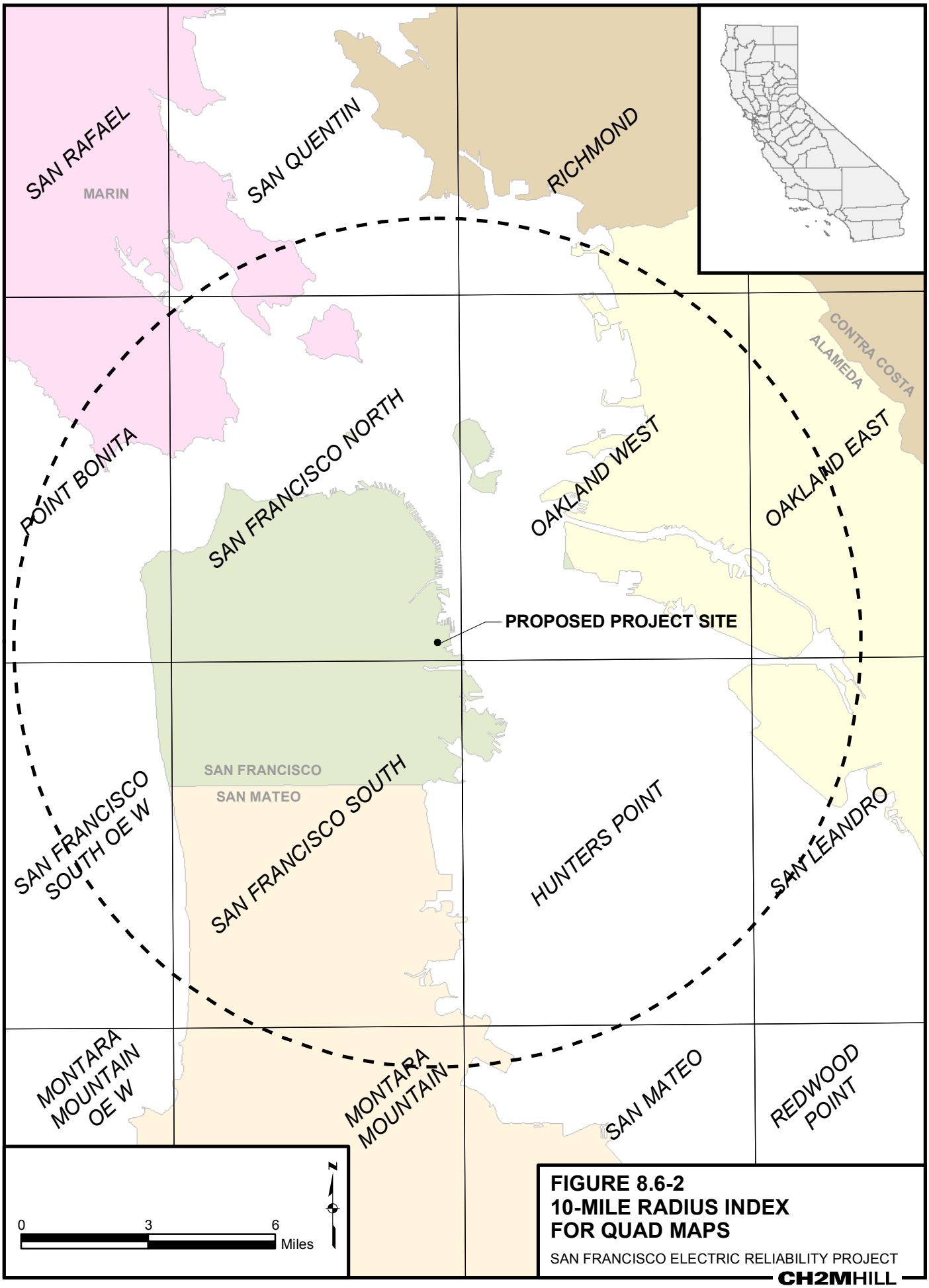
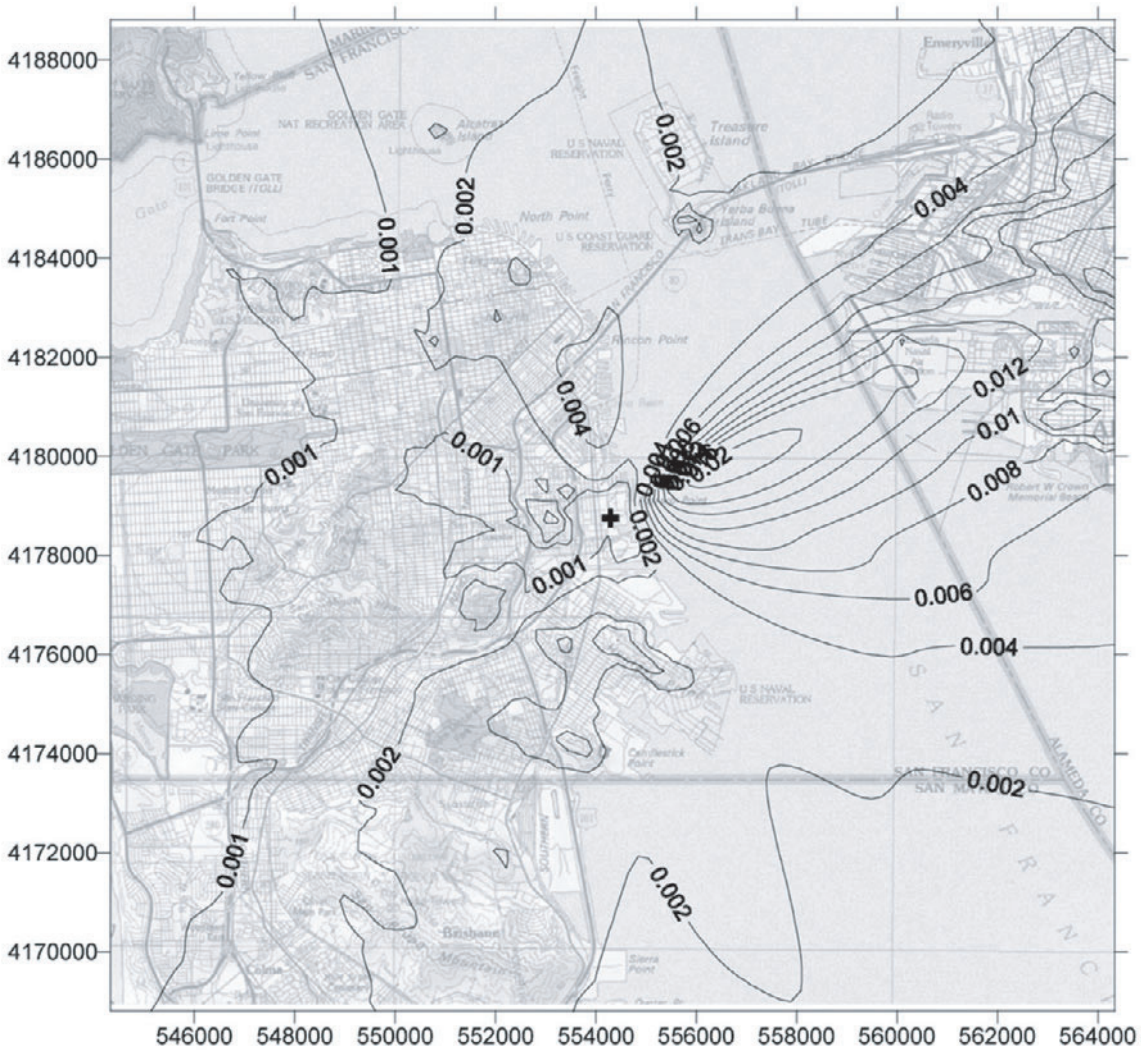


FIGURE 8.6-2
10-MILE RADIUS INDEX FOR QUAD MAPS

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

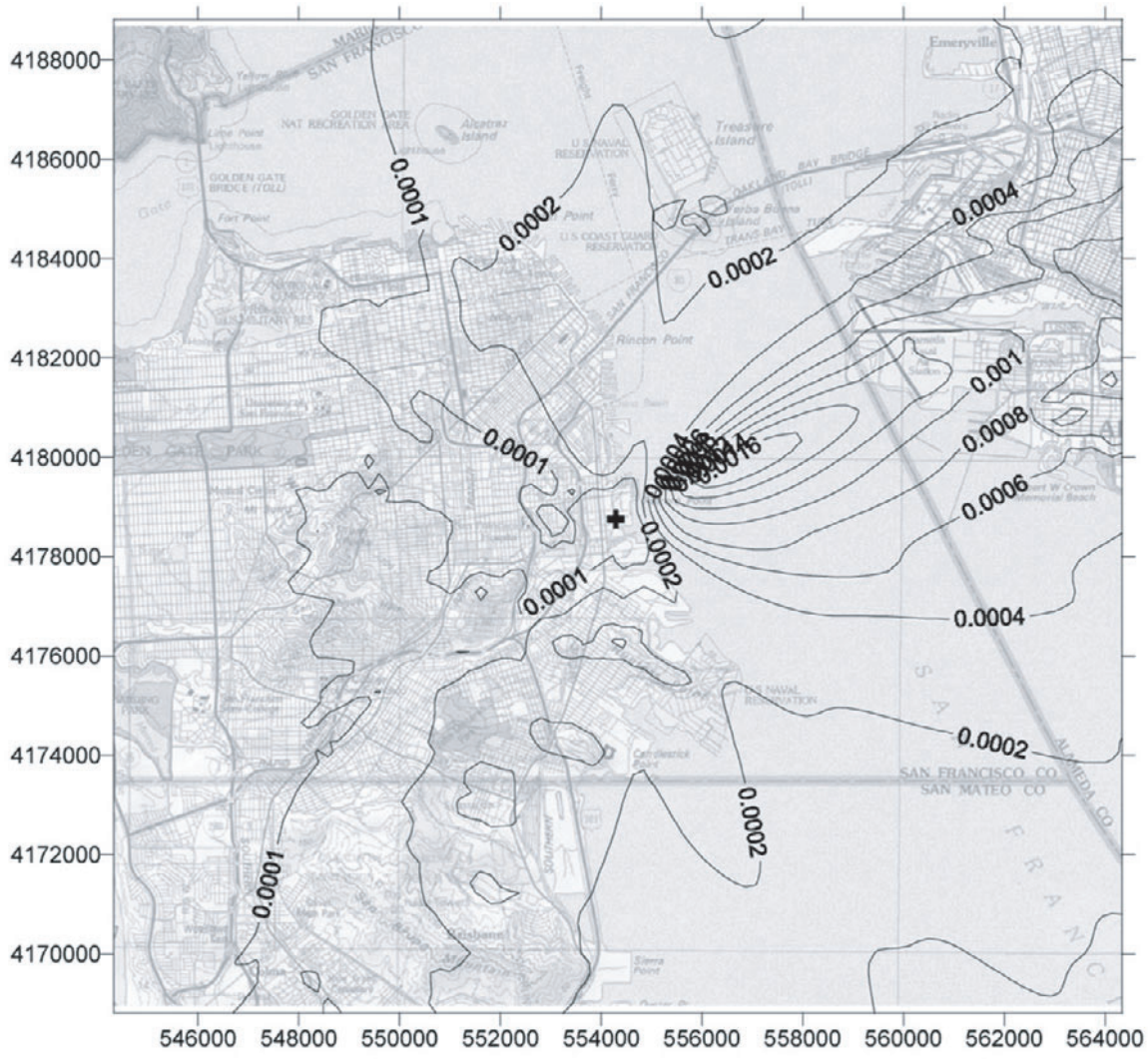
CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\SFPUC\MXDS\8_6-2_10MI_QUAD.MXD 8_6-2_10MI_QUAD.PDF 02/23/2004 16:10:29



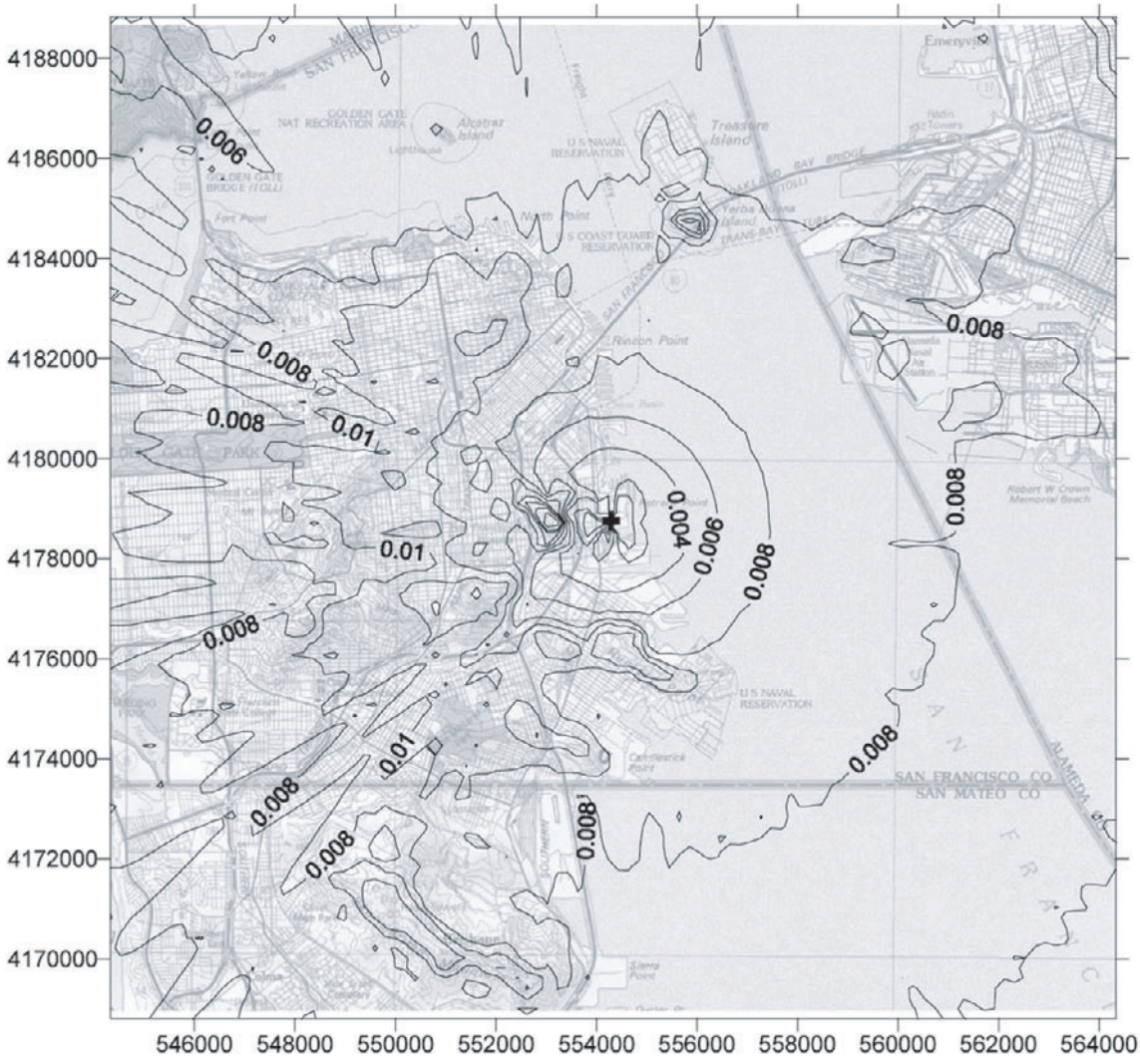
+ indicates project location
Maximum incremental cancer risk is 0.02 in one million
Significance threshold is 10 in one million

FIGURE 8.6-3a
INCREMENTAL LIFETIME CANCER RISK (IN ONE MILLION)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



+ indicates project location
Maximum chronic health hazard index is 0.002
Significance threshold is 1.0

FIGURE 8.6-3b
CHRONIC HEALTH HAZARD INDEX
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT



+ indicates project location
Maximum acute health hazard index is 0.025
Significance threshold is 1.0

FIGURE 8.6-3c
ACUTE HEALTH HAZARD INDEX
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

D012004005RDD_29 (3/9/04)

CH2MHILL